

**PDC Energy, Inc.**  
Second Quarter 2020 Groundwater Monitoring Summary

June 9, 2020

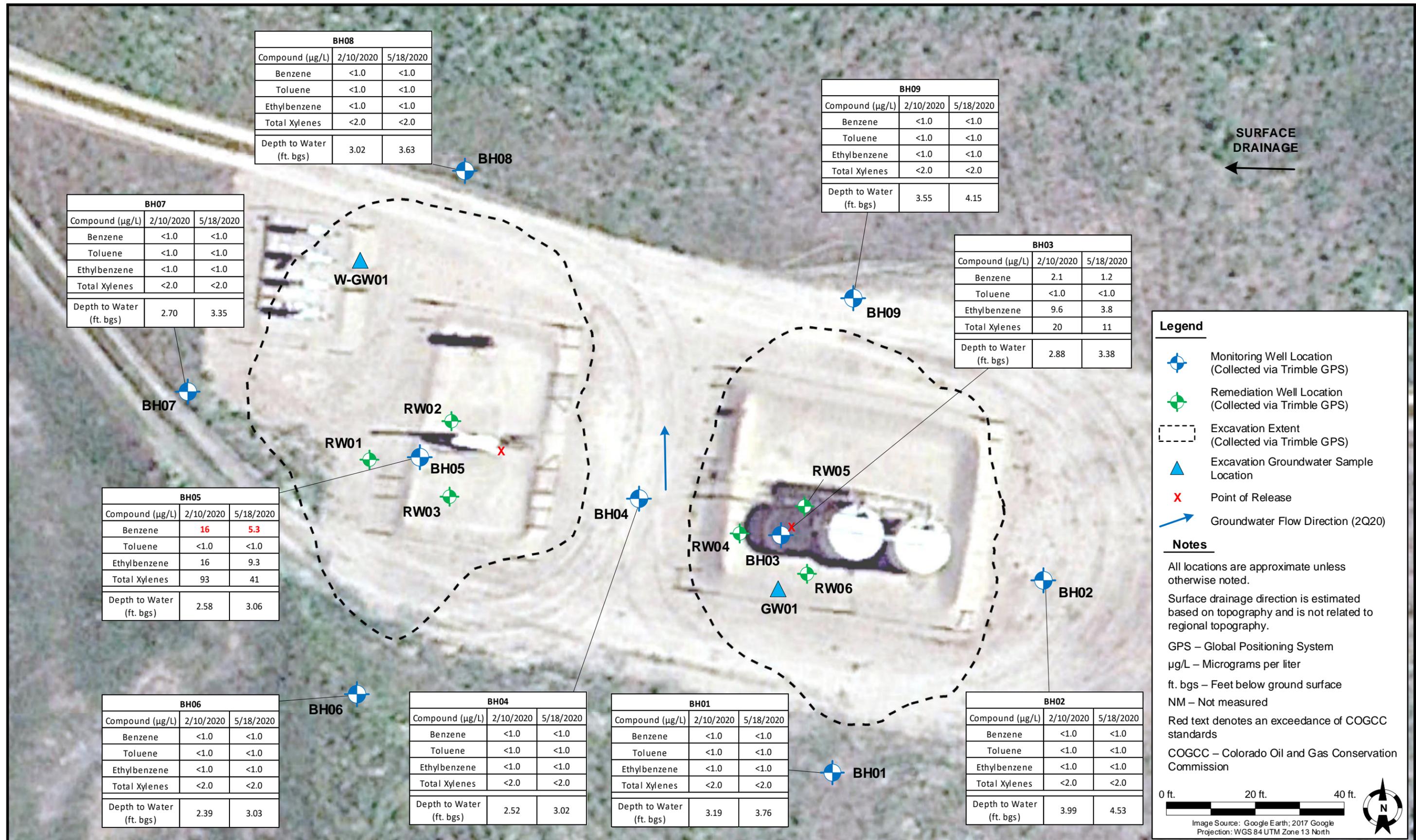
Former Mark 11, 12, 14-35 Tank Battery  
NWSW Section 35 T4N R65W  
Remediation # 12170

This groundwater monitoring summary has been prepared by Tasman Geosciences, Inc. for the former Mark 11, 12, 14-35 tank battery. On May 18, 2020, groundwater monitoring was conducted at all nine monitoring well locations (BH01 – BH09). Nine groundwater samples were submitted to Summit Scientific Laboratory for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260B.

Second quarter 2020 analytical results indicated that the benzene concentration was above the applicable COGCC Table 910-1 groundwater standard in monitoring well BH05. BTEX concentrations were below regulatory standards in the remaining eight monitoring well locations. Sample locations and corresponding analytical results are illustrated on Figure 1. Groundwater elevation data is illustrated in Figure 2. Analytical results are summarized in Table 1 and the laboratory report is included as Attachment A.

Monitored natural attenuation (MNA) was selected as the remediation strategy for this site during the first quarter 2019 and continued through fourth quarter 2019. Due to persisting benzene concentrations, one air sparge (AS) and enhanced fluid recovery (EFR) event was conducted in November 2019. On February 20, 2020, six remediation wells (RW01 – RW06) were installed within the former source area to assist in remedial efforts and address remaining dissolved-phase hydrocarbon impacts. Based on the data collected during the event, EFR/AS was selected as the remediation strategy for this location and initiated in April 2020. EFR/AS will continue as the selected remediation strategy through the third quarter 2020. A summary of the EFR/AS operational data is provided in Table 2.

Third quarter 2020 groundwater sampling will be conducted during August 2020.



BH08		
Compound (µg/L)	2/10/2020	5/18/2020
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	3.02	3.63

BH09		
Compound (µg/L)	2/10/2020	5/18/2020
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	3.55	4.15

BH03		
Compound (µg/L)	2/10/2020	5/18/2020
Benzene	2.1	1.2
Toluene	<1.0	<1.0
Ethylbenzene	9.6	3.8
Total Xylenes	20	11
Depth to Water (ft. bgs)	2.88	3.38

BH07		
Compound (µg/L)	2/10/2020	5/18/2020
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	2.70	3.35

BH05		
Compound (µg/L)	2/10/2020	5/18/2020
Benzene	16	5.3
Toluene	<1.0	<1.0
Ethylbenzene	16	9.3
Total Xylenes	93	41
Depth to Water (ft. bgs)	2.58	3.06

BH06		
Compound (µg/L)	2/10/2020	5/18/2020
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	2.39	3.03

BH04		
Compound (µg/L)	2/10/2020	5/18/2020
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	2.52	3.02

BH01		
Compound (µg/L)	2/10/2020	5/18/2020
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	3.19	3.76

BH02		
Compound (µg/L)	2/10/2020	5/18/2020
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<2.0	<2.0
Depth to Water (ft. bgs)	3.99	4.53

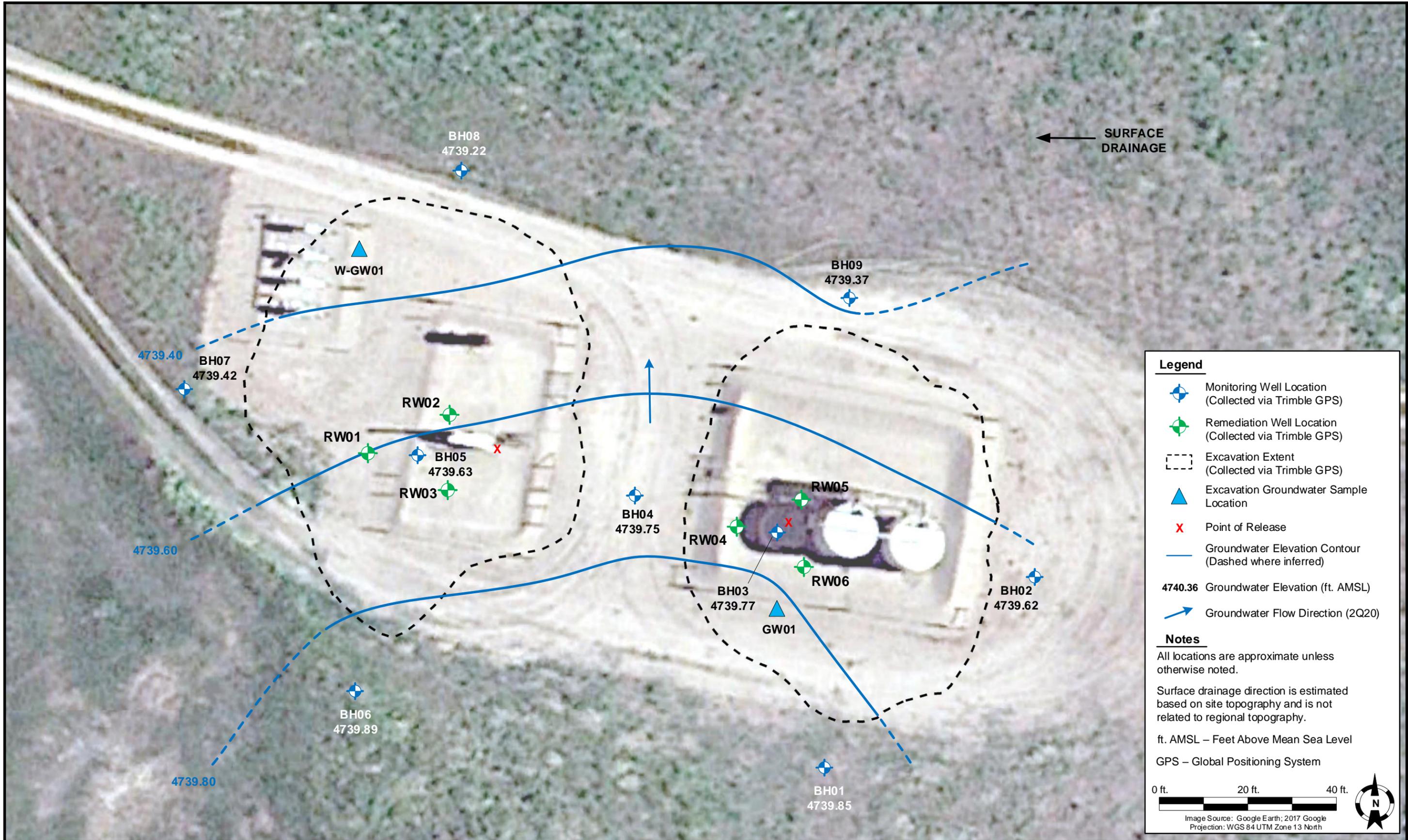
DATE: June 9, 2020  
 DESIGNED BY: C. Hamlin  
 DRAWN BY: M. Dahlgren

**Tasman Geosciences, Inc.**  
 6855 W. 119<sup>th</sup> Ave.  
 Broomfield, CO 80020

**PDC Energy, Inc. – DJ Basin**  
**Former Mark 11, 12, 14-35 Tank Battery**  
 NWSW, Section 35, Township 4 North, Range 65 West  
 Weld County, Colorado

**GROUNDWATER ANALYTICAL RESULTS MAP**

**FIGURE 1**



DATE: May 20, 2020

DESIGNED BY: C. Hamlin

DRAWN BY: L. Martin



**Tasman Geosciences, Inc.**  
6855 W. 119th Ave  
Broomfield, CO 80020

**PDC Energy, Inc. – DJ Basin**  
**Former Mark 11, 12, 14-35 Tank Battery**  
NWSW, Section 35, Township 4 North, Range 65 West  
Weld County, Colorado

**GROUNDWATER  
ELEVATION CONTOUR  
MAP (05/18/2020)**

**FIGURE  
2**

**TABLE 1**  
**FORMER MARK 11, 12, 14-35 TANK BATTERY**  
**GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE**

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water <sup>(2)</sup> (ft.)	Groundwater Elevation (ft. AMSL)
COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup>		5	560	700	1,400		
GW01	11/19/2018	21	4.5	3.6	710	~ 7	NM
W-GW01	11/27/2018	2.9	<1.0	<1.0	22	~ 7	NM
BH01	2/11/2019	<1.0	<1.0	<1.0	<2.0	3.28	4740.33
BH01	5/1/2019	<1.0	<1.0	<1.0	<2.0	3.25	4740.36
BH01	8/8/2019	<1.0	<1.0	<1.0	<2.0	4.75	4738.86
BH01	12/2/2019	<1.0	<1.0	<1.0	<2.0	3.18	4740.43
BH01	2/10/2020	<1.0	<1.0	<1.0	<2.0	3.19	4740.42
BH01	5/18/2020	<1.0	<1.0	<1.0	<2.0	3.76	4739.85
BH02	2/11/2019	<1.0	<1.0	<1.0	<2.0	4.08	4740.07
BH02	5/1/2019	<1.0	<1.0	<1.0	<2.0	4.04	4740.11
BH02	8/8/2019	<1.0	<1.0	<1.0	<2.0	4.44	4739.71
BH02	12/2/2019	<1.0	<1.0	<1.0	<2.0	3.96	4740.19
BH02	2/10/2020	<1.0	<1.0	<1.0	<2.0	3.99	4740.16
BH02	5/18/2020	<1.0	<1.0	<1.0	<2.0	4.53	4739.62
BH03	2/11/2019	18	<1.0	8.3	76	2.96	4740.19
BH03	5/1/2019	8.6	<1.0	5.9	23	2.97	4740.18
BH03	8/8/2019	28	<1.0	<1.0	58	4.17	4738.98
BH03	12/2/2019	1.5	<1.0	10	25	2.93	4740.22
BH03	2/10/2020	2.1	<1.0	9.6	20	2.88	4740.27
BH03	5/18/2020	1.2	<1.0	3.8	11	3.38	4739.77
BH04	2/11/2019	<1.0	<1.0	<1.0	<2.0	2.59	4740.18
BH04	5/1/2019	<1.0	<1.0	<1.0	<2.0	2.56	4740.21
BH04	8/8/2019	<1.0	<1.0	<1.0	<2.0	4.00	4738.77
BH04	12/2/2019	<1.0	<1.0	<1.0	<2.0	2.51	4740.26
BH04	2/10/2020	<1.0	<1.0	<1.0	<2.0	2.52	4740.25
BH04	5/18/2020	<1.0	<1.0	<1.0	<2.0	3.02	4739.75
BH05	2/11/2019	420	<1.0	50	360	2.62	4740.07
BH05	5/1/2019	190	<1.0	15	100	2.60	4740.09
BH05 <sup>(3)</sup>	8/8/2019	<1.0	<1.0	<1.0	7.4	NM	NM
BH05	12/2/2019	15	<1.0	15	84	2.66	4740.03
BH05	2/10/2020	16	<1.0	16	93	2.58	4740.11
BH05	5/18/2020	5.3	<1.0	9.3	41	3.06	4739.63
BH06	2/11/2019	<1.0	<1.0	<1.0	<2.0	2.42	4740.50
BH06	5/1/2019	<1.0	<1.0	<1.0	<2.0	2.33	4740.59
BH06	8/8/2019	<1.0	<1.0	<1.0	<2.0	5.04	4737.88
BH06	12/2/2019	<1.0	<1.0	<1.0	<2.0	2.38	4740.54

**TABLE 1**  
**FORMER MARK 11, 12, 14-35 TANK BATTERY**  
**GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE**

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water <sup>(2)</sup> (ft.)	Groundwater Elevation (ft. AMSL)
<b>COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>		
BH06	2/10/2020	<1.0	<1.0	<1.0	<2.0	2.39	4740.53
BH06	5/18/2020	<1.0	<1.0	<1.0	<2.0	3.03	4739.89
BH07	2/11/2019	<1.0	<1.0	<1.0	<2.0	2.79	4739.98
BH07	5/1/2019	<1.0	<1.0	<1.0	<2.0	2.65	4740.12
BH07	8/8/2019	<1.0	<1.0	<1.0	<2.0	5.47	4737.30
BH07	12/2/2019	<1.0	<1.0	<1.0	<2.0	2.79	4739.98
BH07	2/10/2020	<1.0	<1.0	<1.0	<2.0	2.70	4740.07
BH07	5/18/2020	<1.0	<1.0	<1.0	<2.0	3.35	4739.42
BH08	2/11/2019	<1.0	<1.0	<1.0	<2.0	3.10	4739.75
BH08	5/1/2019	<1.0	<1.0	<1.0	<2.0	3.05	4739.80
BH08	8/8/2019	<1.0	<1.0	<1.0	<2.0	4.66	4738.19
BH08	12/2/2019	<1.0	<1.0	<1.0	<2.0	3.11	4739.74
BH08	2/10/2020	<1.0	<1.0	<1.0	<2.0	3.02	4739.83
BH08	5/18/2020	<1.0	<1.0	<1.0	<2.0	3.63	4739.22
BH09	2/11/2019	<1.0	<1.0	<1.0	<2.0	3.63	4739.89
BH09	5/1/2019	<1.0	<1.0	<1.0	<2.0	3.64	4739.88
BH09	8/8/2019	<1.0	<1.0	<1.0	<2.0	4.12	4739.40
BH09	12/2/2019	<1.0	<1.0	<1.0	<2.0	3.56	4739.96
BH09	2/10/2020	<1.0	<1.0	<1.0	<2.0	3.55	4739.97
BH09	5/18/2020	<1.0	<1.0	<1.0	<2.0	4.15	4739.37

**Notes:**

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective May 1, 2018.
2. Depth to water measurements were measured from ground surface for excavation samples. Monitoring well measurements were collected from top of casing and adjusted using survey data to reflect depth of water from ground surface.
3. Initial water level measurement prevented by obstruction. Purge volume calculation and sample collection performed following obstruction removal.

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

(<) = Analytical result is less than the indicated laboratory reporting limit.

ft. = Feet

AMSL = Above Mean Sea Level

**BOLD** = Analytical result is in exceedance of COGCC groundwater standards.

NM = Not measured

**TABLE 2**  
**FORMER MARK 11, 12, 14-35 TANK BATTERY**  
**EFR / AS OPERATIONAL SUMMARY TABLE**

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	Average Air Flow Rate (cfm)
<b>Fourth Quarter 2019</b>						
11/6/2019	BH03, BH05	6	168	None	0	0
<b>Quarterly Totals</b>		<b>6</b>	<b>168</b>		-	-
<b>Second Quarter 2020</b>						
4/2/2020	BH03, BH05	6	84	RW01, RW02, RW03, RW04, RW05, RW06	10	10
4/21/2020		6	84		10	15
5/6/2020		6	84		10	10
5/20/2020		6	84		10	10
6/3/2020		6	42		10	10
<b>Quarterly Totals</b>		<b>12</b>	<b>84</b>		-	-

**Notes:**

EFR = Enhanced fluid recovery

AS = Air sparge

psi = Pounds per square inch

cfm = Cubic feet per minute

## Attachment A

# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

May 21, 2020

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Mark 11,12,14-35

Work Order #2005196

Enclosed are the results of analyses for samples received by Summit Scientific on 05/18/20 17:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Muri Premer". The signature is written in a cursive style with a large initial "M" and a long, sweeping underline.

Muri Premer For Paul Shrewsbury

President



PDC Energy  
1775 Sherman St. STE. 3000  
Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
05/21/20 11:26

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	2005196-01	Water	05/18/20 11:34	05/18/20 17:30
BH02	2005196-02	Water	05/18/20 11:43	05/18/20 17:30
BH03	2005196-03	Water	05/18/20 12:04	05/18/20 17:30
BH04	2005196-04	Water	05/18/20 11:23	05/18/20 17:30
BH05	2005196-05	Water	05/18/20 12:14	05/18/20 17:30
BH06	2005196-06	Water	05/18/20 11:13	05/18/20 17:30
BH07	2005196-07	Water	05/18/20 10:57	05/18/20 17:30
BH08	2005196-08	Water	05/18/20 10:50	05/18/20 17:30
BH09	2005196-09	Water	05/18/20 11:51	05/18/20 17:30

Summit Scientific

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

2005196

# Summit Scientific

741 Corporate Circle Suite 1 ♦ Golden, Colorado 80401  
303-277-9310 ♦ 303-374-5933 Fax

Page 1 of 1

Client: PDC/Tasman  
Address: 6855 W 119th Ave  
City/State/Zip: Broomfield CO 80020  
Phone: 303-487-1228 Fax: -  
Sampler Name: J Marws

Project Manager: Mark Longhurst  
E-Mail: Mark.longhurst@PDCE.com  
Project Name: Mark 11, 12, 14-35  
Project Number: 7/9

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analyze For:						Special Instructions		
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)								
BH01	5/18/20	1134	3	X				X											
BH02	5/18/20	1143	3	X				X											
BH03	5/18/20	1204	3	X				X											
BH04	5/18/20	1123	3	X				X											
BH05	5/18/20	1214	3	X				X											
BH06	5/18/20	1113	3	X				X											
BH07	5/18/20	1057	3	X				X											
BH08	5/18/20	1050	3	X				X											
BH09	5/18/20	1151	3	X				X											

Relinquished by: <u>[Signature]</u>	Date/Time: <u>5/18/20 1427</u>	Received by: <u>Tasman Lock Box</u>	Date/Time: <u>5/18/20 1427</u>	<b>Turn Around Time (Check)</b> Same Day <input type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/> 48 Hours <input type="checkbox"/>	Notes:
Relinquished by: <u>TASMAN Lock Box</u>	Date/Time: <u>05/18/2020 1420</u>	Received by: <u>[Signature]</u>	Date/Time: <u>05/18/2020 1420</u>		
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:	<b>Sample Integrity:</b> Temperature Upon Receipt: <u>300</u> Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

### Sample Receipt Checklist

2005196

PDC/Tasman

Client Project ID:

MARK 1, 2, 4-35

Shipped Via: H.D./P.U./FedEx/UPS/USPS/Other

Airbill #:

Matrix (check all that apply):

Air

Soil/Solid

Water

Other:

(Describe)

Temp (°C)

3.0

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ? NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are samples with holding times due within 48 hours sample due within 48 hours present?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace present? <b>If yes, contact client and note in narrative.</b>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>HCl</u>
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ? Record the pH in Comments.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Additional Comments (if any):

<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.

Custodian Printed Name or Initials

PL

Signature of Custodian

[Signature]

Date/Time

05/18/2020



PDC Energy  
 1775 Sherman St. STE. 3000  
 Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
 05/21/20 11:26

**BH01**  
**2005196-01 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **05/18/20 11:34**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	2005231	05/19/20	05/20/20	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **05/18/20 11:34**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		138 %		23-173	"	"	"	"	
Surrogate: Toluene-d8		90.8 %		20-170	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		108 %		21-167	"	"	"	"	

Summit Scientific



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



PDC Energy  
 1775 Sherman St. STE. 3000  
 Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
 05/21/20 11:26

**BH02**  
**2005196-02 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **05/18/20 11:43**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2005231	05/19/20	05/20/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **05/18/20 11:43**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		129 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		91.4 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %		21-167		"	"	"	"	

Summit Scientific

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PDC Energy  
 1775 Sherman St. STE. 3000  
 Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
 05/21/20 11:26

**BH03**  
**2005196-03 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **05/18/20 12:04**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>Benzene</b>	<b>1.2</b>	1.0		ug/l	1	2005231	05/19/20	05/20/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>3.8</b>	1.0		"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>11</b>	2.0		"	"	"	"	"	"	

Date Sampled: **05/18/20 12:04**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		130 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		88.1 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %		21-167		"	"	"	"	

Summit Scientific

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PDC Energy  
 1775 Sherman St. STE. 3000  
 Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 05/21/20 11:26

**BH04**  
**2005196-04 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **05/18/20 11:23**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2005231	05/19/20	05/20/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **05/18/20 11:23**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		132 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		90.8 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		108 %		21-167		"	"	"	"	

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PDC Energy  
 1775 Sherman St. STE. 3000  
 Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
 05/21/20 11:26

**BH05**  
**2005196-05 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **05/18/20 12:14**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>Benzene</b>	<b>5.3</b>	1.0		ug/l	1	2005231	05/19/20	05/20/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>9.3</b>	1.0		"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>41</b>	2.0		"	"	"	"	"	"	

Date Sampled: **05/18/20 12:14**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		128 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		89.8 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		110 %		21-167		"	"	"	"	

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PDC Energy  
 1775 Sherman St. STE. 3000  
 Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
 05/21/20 11:26

**BH06**  
**2005196-06 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **05/18/20 11:13**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2005231	05/19/20	05/20/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **05/18/20 11:13**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		137 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		91.5 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %		21-167		"	"	"	"	

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PDC Energy  
 1775 Sherman St. STE. 3000  
 Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
 05/21/20 11:26

**BH07**  
**2005196-07 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **05/18/20 10:57**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2005231	05/19/20	05/20/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **05/18/20 10:57**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		133 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		91.1 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %		21-167		"	"	"	"	

Summit Scientific

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PDC Energy  
 1775 Sherman St. STE. 3000  
 Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
 05/21/20 11:26

**BH08**  
**2005196-08 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **05/18/20 10:50**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2005231	05/19/20	05/20/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **05/18/20 10:50**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		128 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		90.3 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %		21-167		"	"	"	"	

Summit Scientific

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PDC Energy  
 1775 Sherman St. STE. 3000  
 Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
 05/21/20 11:26

**BH09**  
**2005196-09 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **05/18/20 11:51**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2005231	05/19/20	05/20/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **05/18/20 11:51**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		135 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		91.8 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		109 %		21-167		"	"	"	"	

Summit Scientific

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PDC Energy  
1775 Sherman St. STE. 3000  
Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
05/21/20 11:26

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**

**Summit Scientific**

Analyte	Reporting			Spike	Source	%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

**Batch 2005231 - EPA 5030 Water MS**

**Blank (2005231-BLK1)**

Prepared & Analyzed: 05/19/20

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	16.4		"	13.3		123	23-173			
Surrogate: Toluene-d8	12.5		"	13.3		93.6	20-170			
Surrogate: 4-Bromofluorobenzene	14.0		"	13.3		105	21-167			

**LCS (2005231-BS1)**

Prepared & Analyzed: 05/19/20

Benzene	41.1	1.0	ug/l	33.3		123	51-132			
Toluene	37.9	1.0	"	33.3		114	51-138			
Ethylbenzene	43.2	1.0	"	33.3		130	58-146			
m,p-Xylene	76.2	2.0	"	66.7		114	57-144			
o-Xylene	38.9	1.0	"	33.3		117	53-146			
Surrogate: 1,2-Dichloroethane-d4	14.8		"	13.3		111	23-173			
Surrogate: Toluene-d8	12.9		"	13.3		97.0	20-170			
Surrogate: 4-Bromofluorobenzene	13.3		"	13.3		99.9	21-167			

**Matrix Spike (2005231-MS1)**

Source: 2005157-05

Prepared & Analyzed: 05/19/20

Benzene	315	1.0	ug/l	33.3	181	404	34-141			QM-07
Toluene	43.2	1.0	"	33.3	ND	130	27-151			
Ethylbenzene	106	1.0	"	33.3	130	NR	29-160			QM-07
m,p-Xylene	434	2.0	"	66.7	249	277	20-166			QM-07
o-Xylene	149	1.0	"	33.3	58.9	270	33-159			QM-07
Surrogate: 1,2-Dichloroethane-d4	13.1		"	13.3		98.3	23-173			
Surrogate: Toluene-d8	11.9		"	13.3		89.0	20-170			
Surrogate: 4-Bromofluorobenzene	14.6		"	13.3		110	21-167			

Summit Scientific

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 1775 Sherman St. STE. 3000  
 Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
 05/21/20 11:26

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**

**Summit Scientific**

Analyte	Result	Reporting		Spike Level	Source		%REC		RPD		Notes
		Limit	Units		Result	%REC	Limits	RPD	Limit		

**Batch 2005231 - EPA 5030 Water MS**

Matrix Spike Dup (2005231-MSD1)	Source: 2005157-05			Prepared & Analyzed: 05/19/20						
Benzene	321	1.0	ug/l	33.3	181	423	34-141	1.94	30	QM-07
Toluene	45.2	1.0	"	33.3	ND	136	27-151	4.52	30	
Ethylbenzene	104	1.0	"	33.3	130	NR	29-160	1.97	30	QM-07
m,p-Xylene	430	2.0	"	66.7	249	271	20-166	0.819	30	QM-07
o-Xylene	147	1.0	"	33.3	58.9	263	33-159	1.60	30	QM-07
Surrogate: 1,2-Dichloroethane-d4	13.2		"	13.3		99.2	23-173			
Surrogate: Toluene-d8	12.3		"	13.3		92.0	20-170			
Surrogate: 4-Bromofluorobenzene	14.7		"	13.3		110	21-167			

Summit Scientific

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PDC Energy  
1775 Sherman St. STE. 3000  
Denver CO, 80203

Project: Mark 11,12,14-35

Project Number: [none]

Project Manager: Mark Longhurst

**Reported:**  
05/21/20 11:26

### Notes and Definitions

- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference